The MAC Flyer

AUGUST 1982

Napalm Nightmare . . . 12

The MAC Flyer

MILITARY AIRLIFT COMMAND

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For Greater Safety and Efficiency in MAC Air Operations.

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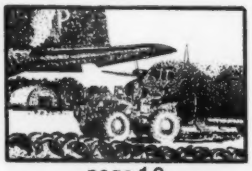
page 4



page 12

page 25

Flyers Anonymous 3
FLIP Through the Changes 4
Mishap with a Moral 8
Global Notes 10
Flying-Hour Milestones 11
Napalm Nightmare 12
Allied Airlifters 16
Excellence in Airmanship 18
XV-15: Tilt-Rotor Technology 20
The Viewer's Guide 23
Deja Vu: Kadena Air Base, Japan 24
C. R. Terror 25
Quick Stoppers 28

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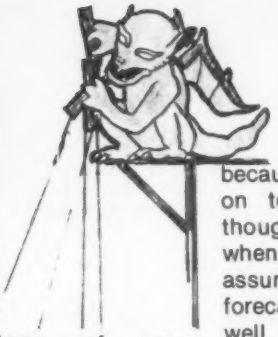
Cover Photo: Airborne C-5 Galaxy with San Francisco Golden Gate Bridge in background.

FLYERS ANONYMOUS



I had no idea the very first completed AWTH form we would review for possible publication in TMF *would be such a "Humdinger."*—Ed

"Aircraft almost contacted ground before pickup by radar."

That's part of what the narrative said as the anonymous flyer described an apparently near-disastrous HC-130 flight. But there's more! Also mentioned was a direct violation of AFR 60-16 when the Herk crew accepted "special VFR" to take off although the weather was actually below fixed-wing minimums. After takeoff, the crew momentarily lost radio contact with both departure and approach control and both pilots exhibited signs of vertigo—that's when they *almost* "contacted" the ground. With cockpit confusion rampant, this crew was lucky to survive this flight. Oh, yes. It was a training mission.

Weather Check

Our next AWTH happens to be about a C-130 crew who almost parlayed a comedy of errors into a calamity. Although the submitter does not mention if the crew asked for or received a detailed preflight weather briefing, he does mention that no one bothered to check destination weather prior to ETP. Evidently, the weather was not checked anytime during the 11-hour-long ferry flight because they doggedly pressed on to their destination even though it was below minimums when they finally arrived. We assume it was most probably forecast to be below minimums well before their arrival—had they bothered to check earlier in the flight. Not only was their destination below minimums, but also their alternate. And to make things really grim, all other fields within range of the remaining fuel were also below approach minimums. With their backs now up against a wall (of their own making), they chose to try an approach at the field with the "best" weather of the bunch. The Herk finally broke out on final *below minimums* and well right of centerline. Now, apparently running on fumes, the pilot, in a desperate attempt to salvage the approach, bent it around and *made* the landing.

After shutting down, they checked the fuel tanks and the dipsticks came up dry.

There are all kinds of lessons that we in the flying fraternity can glean from just these two AWTH reports. One big one that comes immediately to mind is the fact that momentary lapses in even the most basic, "common-sense" areas like fuel planning and checking weather, not to mention knowing and complying with takeoff minimums and maintaining good crew coordination, can put our very lives in the balance. And allowing it to happen is like having a flip of the proverbial coin determine our fate. You can get better odds than that playing Russian roulette.

What's new in Flight Information Publications?

FLIP Through the

by Captain Gale E. Clouse, Jr.
Associate Editor

All DOD pilots and aircraft from the Army's Blackhawk to the Air Force's Starlifter to the Navy's new Hornet have one common bond—their publications for flight information. Whether it be an IFR enroute chart or the instrument approach book, one DOD agency—the Defense Mapping Agency Aerospace Center (DMAAC), is responsible for the pubs used in every cockpit of the U.S. Armed Forces. The most common publication of the St. Louis-based agency is probably the Flight Information Publication, better known as FLIP.

Over the past several years FLIP products have undergone significant changes. Many improvements have already been made and more are planned for the next couple of years—and beyond. DMAAC's goals for FLIP products are first, to improve their readability; second, to logically organize FLIP products; and finally, to design these crew aids for optimum use in the cockpit. Our flying safety goal is to make the most effective use of these FLIP products to keep MAC aircrews informed. Currency of information is critical to safe and effective flying operations.

Because it's a never-ending task to stay on top of all the changing airspace requirements and aeronautical information, DMAAC folks use an information cycle of 28 days or multiples of 28 days to regulate the information flow. FLIP products are based on this 28 day cycle which is derived from the International Civil Aviation Organization (ICAO). The ICAO uses the Aeronautical Information Regulation and Control (AIRAC) cycle of 28 days to help all ICAO-member countries make their changes in procedures on a common day. DMAAC needs proposed changes to FLIP publications approximately 3 weeks prior to the effective date of the various products.

Enroute Supplements

If you've picked up an Alaska Supplement recently, you've probably noticed it's now a very handy 5-by-7 inch size. Published by the National Oceanic and Atmospheric Administration (NOAA), of the Department of Commerce, this supplement is for both military and civilian users of Alaskan airspace. The good news is the supplement can fit inside a flight suit leg pocket. This same small size should be available and in production in 1983 for all worldwide enroute supplements. In addition, all these supplements will have coordinate data in tenths of a minute of latitude and longtitude available for INS operations.

U.S. Low Altitude Terminal Books

A brand new FLIP product entitled "Selected Low Altitude U.S. Instrument Approach Procedures," first appeared in a 5-volume series in January 1981. This series was published specifically for high performance and heavy-weight aircraft. It contains all DOD instrument approach procedures and selected civil procedures for airfields with a runway length of 5,000 feet or greater and a weight bearing capacity of T60 or greater. At the same time, the existing 9-volume set of low altitude approach procedures was expanded to 12 volumes. The thickness of each book of the 12-volume set was reduced to no more than five-eighths of an inch. This set of 12 books has *all* DOD instrument approach

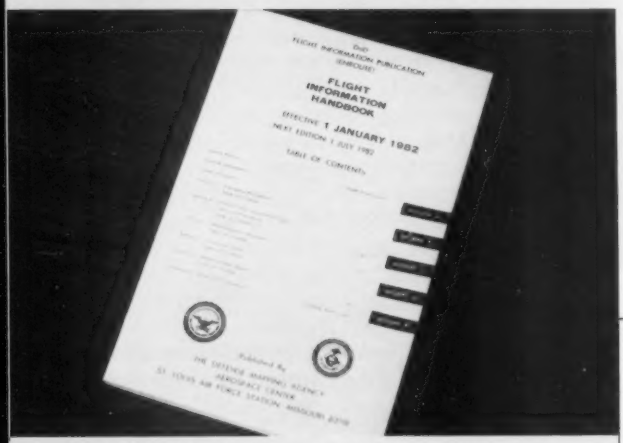
12-volume Low Altitude U.S. Instrument Approach Procedures have *all* DOD instrument approach procedures and selected civil procedures requested by the services.

Changes

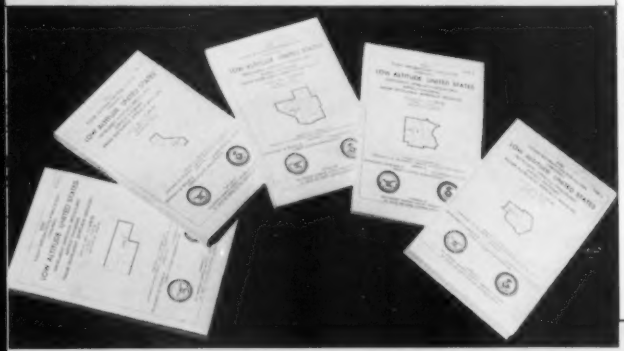
procedures and selected civil procedures requested by the services. It's particularly suitable for those military aircraft and helicopters which must operate into smaller U.S. airfields. The result of these changes is enhanced cockpit utility for aircrews. They can select the FLIP publications most effective for their very own airmachine and mission.

Other changes to DOD terminal books have included relocating radar minima data from enroute supplements to terminal books. By August 1982, these radar minima will be added to individual instrument approach procedure pages in addition to their normal location in the front of the approach book. The paper of the approach plate pages has been strengthened so it doesn't tear as easily as in earlier books. (Old heads will surely remember the sure sign new books were on the way—the old ones were in tatters.)

Besides these changes, there's a new way that minimum safe altitudes are depicted. Normally in the lower right of the planview portion of low altitude approach plates will be a seven-eighths inch diameter circle with a symbol of the navaid on which the approach is based, in the center of the circle. The identifier of the navaid will be placed on top of the circle, and inside the circle will be the familiar sector altitudes up to a maximum of four altitudes between various radials of the navaid. The highest sector altitude depicted is the minimum safe altitude within 25 nautical miles. This altitude will give you terrain and obstruction clearance of 1,000 feet. An additional change to selected low altitude approach plates with initial approach fixes are notes indicating the emergency safe altitude within 100 miles of the particular field.



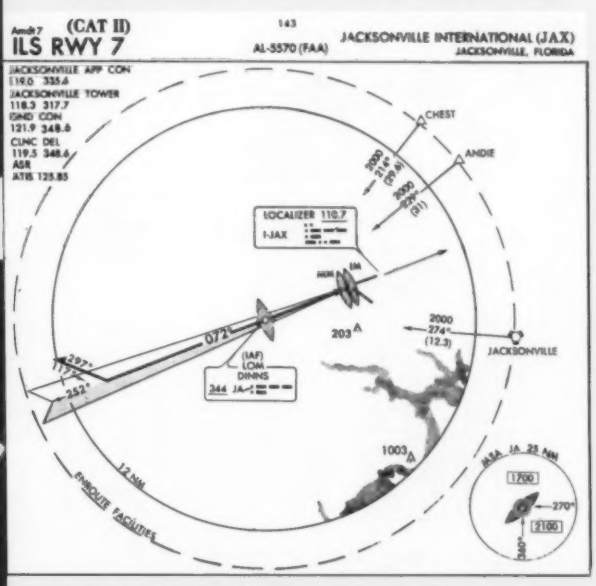
Flight Information Handbook (initial issue: July 1981) by DMAAC is packed with aeronautical data which is not changed frequently. Photos by DMAAC



"Selected Low Altitude U.S. Instrument Approach Procedures" 5-volume series first appeared in January 1981.

Airport Diagrams

As more MAC aircraft convert their navigation systems to INSs, their crewmembers will become familiar with the airfield diagrams published in DOD approach books. These recently developed diagrams allow one to align an aircraft's INS by inserting a very accurate position gleaned from the airport diagram. The normal procedure is to



Approach plate for Jacksonville International, ILS Runway 7, Cat II. In lower right of the planview portion of plate is a circle that depicts sector altitudes for the field.

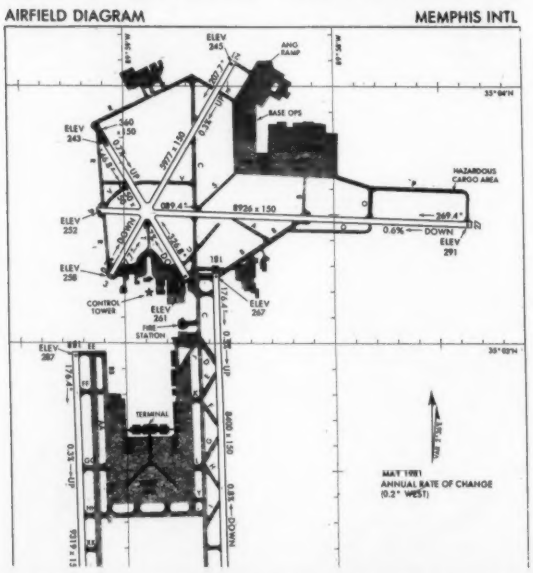
use the aircraft parking spot and interpolate from the diagram to get the exact coordinates used for present position. The diagrams also give the magnetic variation of the field as well as an annual rate of change in this variation. They're also useful to aid in taxi operations because they accurately depict the runways and taxiways. Currently all DOD approach books, except Europe, contain these diagrams.

Handbook, Handbook, Who's Got the Handbook?

Especially popular since its initial issue in July 1981 is a FLIP Flight Information Handbook issued every 6 months by DMAAC. This conveniently-sized book is packed with aeronautical data which is not changed frequently. Key sections include emergency procedures, national and international flight data and procedures, meteorological information, conversion tables, and standard time signals. Because aircrews like this brief compendium of facts so well, the books seem to magically disappear from military flight planning rooms and base ops all over the world. If you unintentionally "scarf" up one of these "nifty nuggets" of military flying facts, be sure it's current and that you share it with your fellow flyers. Better yet, why not return it for all to use?

Area Arrival Charts

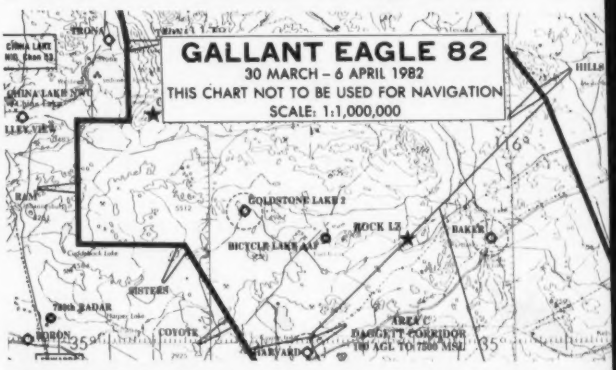
Navs, do you remember drawing concentric rings of 10 nautical miles on terrain charts to help monitor approaches and pick out obstacles? Well, there's a new product called the Area Arrival Chart, that'll give you all the information you'll need to monitor those approaches safely. One of the first charts to be published will be the Albuquerque area arrival chart available in January 1983. This chart has a scale of 1 inch to 7 nautical miles and depicts terrain features in an area of 50 miles from the Albuquerque vortac, and also includes mountain peaks, ridge lines, and other obstructions. The low altitude airways structure, restricted areas, and military operating areas will also be depicted. It's a well designed product that should be pleasing to MAC aircrews, as well as adding at additional measure of safety.



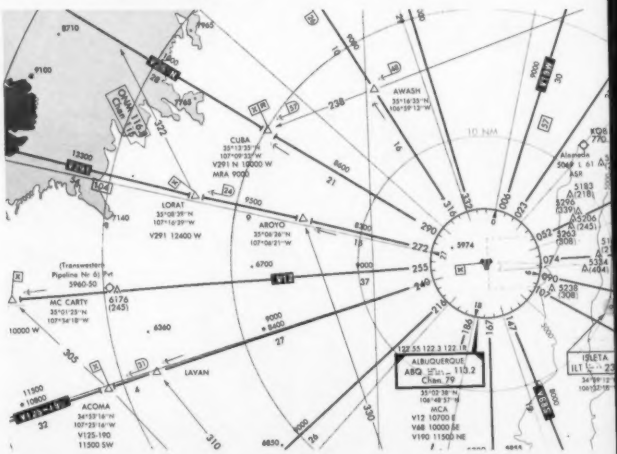
Airfield Diagram, Memphis International, published by DMAAC. Diagram can be used to furnish very accurate present position for use with INS and Omega-equipped aircraft.

Enroute Charts

In all of these enhancements of FLIP products, enroute charts have not been neglected. DMAAC produced a brand new Indian Ocean area enroute



Special Exercise Graphic, Joint Military Training Exercise, Gallant Eagle 82, published by DMAAC.



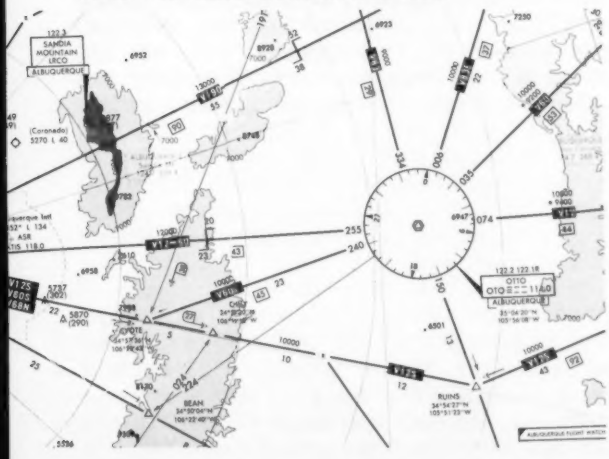
Prototype of the Albuquerque Area Arrival Chart to be available in January 1983.

chart in 1981. Designated Pacific, Australasia and Antarctica (PAA) 20, this chart has a scale of 1 inch to 225 nautical miles and is a must if you fly into Diego Garcia. European-bound MAC crews may also notice the L-3 chart has a new inset area covering the Leeds/Bradford area of the United Kingdom.

DMAAC has also been active in producing special exercise graphics for joint military training exercises. Recent productions of these types of charts have included Bold Eagle 82 and Gallant Eagle 82. These exercise charts usually have a scale of 1:1,000,000 and while they are *not* to be used for navigation, they do give depictions of exercise areas, airspace areas, free-fly corridors, airfields, and approach aids. Next time you're scheduled to participate in a major joint military training exercise, check to see if a special graphic has been published. It'll be well worth the effort.

Coming Soon

A major enroute chart redesign is now underway. The Interagency Air Cartographic Committee (IACC), composed of various U.S. Government agencies involved in air operations, has formed a task group to coordinate and execute the redesign work. Its goal is to modernize the U.S. enroute charts and remove clutter and congestion. New cartographic depictions may include up to three or four different colors to better separate different types of information. These new charts will depict information to support inertial navigation and global positioning systems and they'll also use different symbols to depict the aeronautical data. Look for these new charts sometime in 1983.



And the future

We've talked about enroute supplements, low altitude terminal books, airport diagrams, flight handbooks, area arrival charts and enroute charts. These FLIP products communicate their information through the media of printed publications, charts, and illustrations. Aircrews need that information to operate efficiently in today's air traffic control environment. But there's an information explosion occurring right now throughout the world using electronic technology and computers. The medium for communicating FLIP products to the cockpit may, in the not too distant future, include ground-based military computers talking to airborne aircraft computers. Commercial cockpits are already being designed with an eye towards using this type of software, and perhaps, we'll see electronic FLIP products sooner than we expect. In the meantime though, we need to be aware of the recent improvements in our flight publications so all of us in the aerospace community can fly safely. And until all the products are so computerized, anytime is the right time to "FLIP through the changes."

Prototype design of PAA 3 enroute chart. New charts are designed to remove clutter and congestion from existing charts and use different symbols for aeronautical data to improve readability.

Mishap with a Moral

Flying in the Wake

It was a warm July morning and the commuter airline crew had just completed refueling their Piper Navajo in preparation for the short flight from Reading, Pennsylvania, to Philadelphia International. Spending only 10 minutes on the ground at Reading and not filing a flight plan, they took off at 0651 with one passenger aboard, planning to "pop up" and air file with approach control.

Flight 501 contacted Philadelphia approach control at 0700 and reported in as a VFR "pop-up" arrival into Philadelphia International Airport at 3,500 feet. The controller told flight 501 to enter the terminal control area at 2,500 feet and to fly a right base leg for runway 27R and identified the Piper on radar 14 miles northwest of the airport. Shortly thereafter the copilot declared he had the airport in sight. The approach controller then asked the commuter to report over downtown Philadelphia on its present heading of 120° and advised them they were number 4 to land behind a United Airlines Boeing 727. The Boeing jet was over the Walt Whitman bridge, about 5.5 miles from the runway, on an ILS approach to runway 27R. Meanwhile,the copilot of the Navajo reported the traffic in sight, and flight 501 was advised to follow United 555 and to contact the control tower.

At 0710, the copilot of flight 501 contacted the tower controller, who asked the flight crew to again confirm that United 555 was in sight, and to report 1 mile out on final approach. The commuter copilot reported the United in sight and turned on to final approach over the Philadelphia Navy Yard cranes, about 2.3 miles from the end of runway 27R. The tower controller cleared the Piper to land at 0711, and later stated that he saw the aircraft on a stabilized approach about ½-mile on final. At this time,United 555 was turning off the runway. Believing there was adequate separation between the aircraft, the controller did not issue a wake turbulence caution.

The tower supervisor then noticed that the Piper Navajo was making erratic movements. The other tower controllers and the ground controller also saw the aircraft suddenly roll from side to side up to 70° of bank. Then the Piper's nose pitched up as the aircraft rolled inverted to the left, with the nose falling. The Navajo, now out of control, crashed nose first into the ground adjacent to the approach end of runway 27R. Two pilots and the one passenger aboard were killed instantly and the aircraft was destroyed by the impact.

Analysis

In analyzing this mishap, NTSB officials were aided greatly by both eyewitness accounts and a radar summary of the flight paths of the mishap Navajo and the 727. First, United 555 was making a straight-in ILS approach to runway 27R. At approximately the same time, the Piper Navajo was on a visual approach from the north and entered onto the final approach to runway 27R about 2 miles from the threshold at 5,000 feet AGL. The commuter rolled out on final approach at 0712 slightly left and 300 feet below the flight path of the United jetliner. In fact, only 52 seconds separated the two aircraft, with the commuter flight being outside the influence of the wake turbulence until it turned onto final, within 1 mile of the runway.

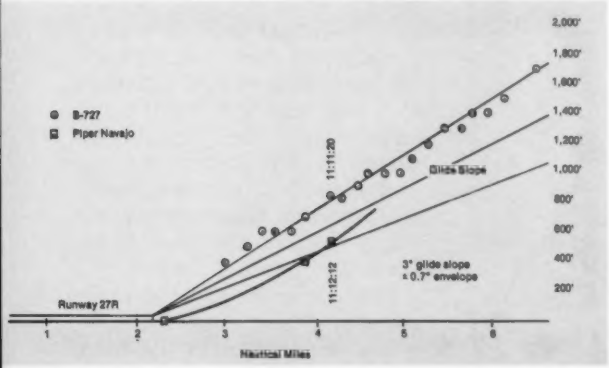
Witnesses saw the Piper Navajo begin to oscillate from left to right, pitch up into a nose-high attitude, and roll left, followed by a nose-low attitude. Data taken from the ARTS III radar recorder showed that at a point ½-mile from the threshold, flight 501 was about 100 feet AGL and 150 feet below the flight path of United 555. The National Transportation Safety Board concluded that, as flight 501 continued its descent, it ap-

parently flew into the wingtip vortices from United 555, became uncontrollable, and crashed into the ground.

Effects of Wake Turbulence

When flight 501 arrived at Philadelphia, the winds were reported calm. Studies have shown that in calm wind conditions, wingtip vortices are strongest and most constant behind and below the generating aircraft. The pilot of flight 501 flew a flight path lower and flatter than the flight path of United 555 and, as advertised, the lower flight path was part of the recipe for disaster.

Flight in the vortex cores of large aircraft can induce extremely strong rolling movements which can exceed the roll capabilities of the encountering aircraft. The rolling effect is caused by the wingtip vortex core rotating counterclockwise. Since flight 501 rolled inverted to the left and collided with the ground left (south) of runway centerline, it is most likely that the aircraft encountered the right wingtip vortex generated by the Boeing 727. The Piper aircraft did not have the control capability to overcome the roll forces generated by the vortices of the larger jetliner.



Automated Radar Terminal System III ground track and glide slope of B-727 and Piper Navajo.

Flight Crew Responsibility

According to the Airman's Information Manual, if you accept a visual clearance or instructions to follow an aircraft, you also accept separation responsibility. You're expected to adjust your operations and flight path as necessary to avoid the possibility of serious wake encounters. The crew of flight 501 twice accepted instructions to follow United 555 and also accepted a visual approach clearance. Consequently, it was their responsibility to provide a safe landing interval and wake turbulence separation.

Air traffic controllers will provide VFR aircraft with wake turbulence information if, in the tower controller's opinion, the aircraft may be adversely affected by wake turbulence from a large preceding aircraft. This will include the position, altitude, and direction of the flight of the large aircraft, followed by the phrase "caution, wake turbulence." In this case, none of the controllers felt that a caution was required. The Safety Board's review of the circumstances in this accident provided no basis to challenge the controllers' decision.

Probable Cause

The NTSB determined the probable cause of this accident was the loss of aircraft control due to an encounter with wake turbulence from the preceding aircraft. The Piper Navajo was at an altitude too low for recovery and the pilot of the commuter aircraft failed to follow established separation and flight path selection procedures for wake turbulence avoidance.

Wake turbulence can affect MAC flyers in all seasons, so don't let yourself get in the position of following too close or your friends may be holding a "wake" for you.

—Adapted from NTSB-AAR-81-1

GLOBAL NOTES

Staff Changes at *TMF*

Our friendly flying safety magazine has a new supervising editor. Major James M. Lee takes over as "chief ink-stained wretch" when Lieutenant Colonel Alan D. York departs for sunny Florida and an assignment with the 1st Special Operations Wing (TAC), Hurlburt, as the Wing Logistics Plans Officer. Lieutenant Colonel York has been our chief wordsmith here at *The Mac Flyer* for the last year and before that served as associate editor for 3 years.

Major Jim Lee comes to *TMF* via Dover AFB, where he served as a C-5 aircraft commander and as plans officer for the 436 MAW. He's also served as a forward air controller in the O-2A, in Vietnam; a T-38 IP at Columbus AFB; Chief of Logistics at Mount Hebo AFS, Oregon; and Assistant Chief of the 436 MAW Command Post. To this potpourri of positions, Major Lee adds previous journalism experience through both World Press Institute, in an independent study project, and as a general assignment reporter for the Estherville, Iowa, "Daily News."

Major Jim Lee, left, takes over job of Supervising Editor of *The MAC Flyer* from Lieutenant Colonel Al York, right.

Taking on the challenging and sometimes overwhelming job of Safety Awards Manager and Managing Editor of *The MAC Flyer* is Mrs. Frances A. Caldwell. Fran, as she prefers to be called, comes to *TMF* from the Awards and Decorations Branch of Headquarters MAC where she managed the Special Awards and Trophies Program for both MAC and AFCC. Fran is now the resident expert on MAC, USAF and NSC safety awards and will answer questions on and process all of the various safety awards nominations coming through our office. In addition to helping edit the magazine, Fran's other duties will include keeping track of the magazine's distribution and updating the mailing list each month. Ms. Lorena M. Graul, Fran's predecessor, is now serving as a management analyst with Headquarters Air Force Communications Command, based at Scott.

Fran Caldwell is the new Managing Editor of *TMF*, as well as the Safety Awards Manager.

TMF welcomes Major Jim Lee and Mrs. Fran Caldwell aboard, and gives a reluctant but fond farewell to Lorry Graul and Lieutenant Colonel Al York.

MAC INDIVIDUAL FLYING-HOUR MILESTONE AWARDS

10,000

Lt Col John R. McCaughey, 166 TAG
Lt Col Judson E. Wooding, 166 TAG
Maj John V. Hartzell, 708 MAS
Maj James M. McCormick, 701 MAS
CMSgt Walter L. Grace, 701 MAS
MSgt Elmore Jackson, Jr., 701 MAS
MSgt Herbert R. Loveless, 701 MAS

5,000

Col John F. Hilgenberg, 30 MAS
Lt Col Stephan Havas, 94 TAW
Lt Col Fred N. Larson, 179 TAG
Lt Col Craig R. Smith, 701 MAS
Maj Larry K. Dagley, 64 TAS
Maj Curt Fischer, 3 MAS
Maj John J. Freisinger, 1551 FTS
Maj Bruce L. Gumble, 7 MAS
Maj Arthur E. Jacobson, 701 MAS
Maj Robert J. Korose, 54 WRS
Maj Thomas W. Poe, Jr., 701 MAS
Maj Clinton L. Stoneham, 337 TAS
Capt David C. Cotton, 41 MAS
Capt William J. Crites, 3 MAS
Capt Edward B. Hernandez, 701 MAS
CMSgt Randolph T. Turck, 335 MAS
SMSgt Richard K. Baker, 335 MAS
SMSgt Arthur J. Dodgins, 701 MAS
SMSgt William E. Williford, 700 TAS
MSgt William B. Brinkley, 64 TAS
MSgt Edward A. Gonzales, 701 MAS
MSgt John A. Hendricks, 1550 TTS
MSgt Larry N. Oliver, 701 MAS
TSgt Walter L. R. Harrah, III., 701 MAS
TSgt Roy C. Menard, 700 TAS
TSgt Frederick R. Samer, 335 MAS
TSgt Horace J. Stewart, Jr., 708 MAS

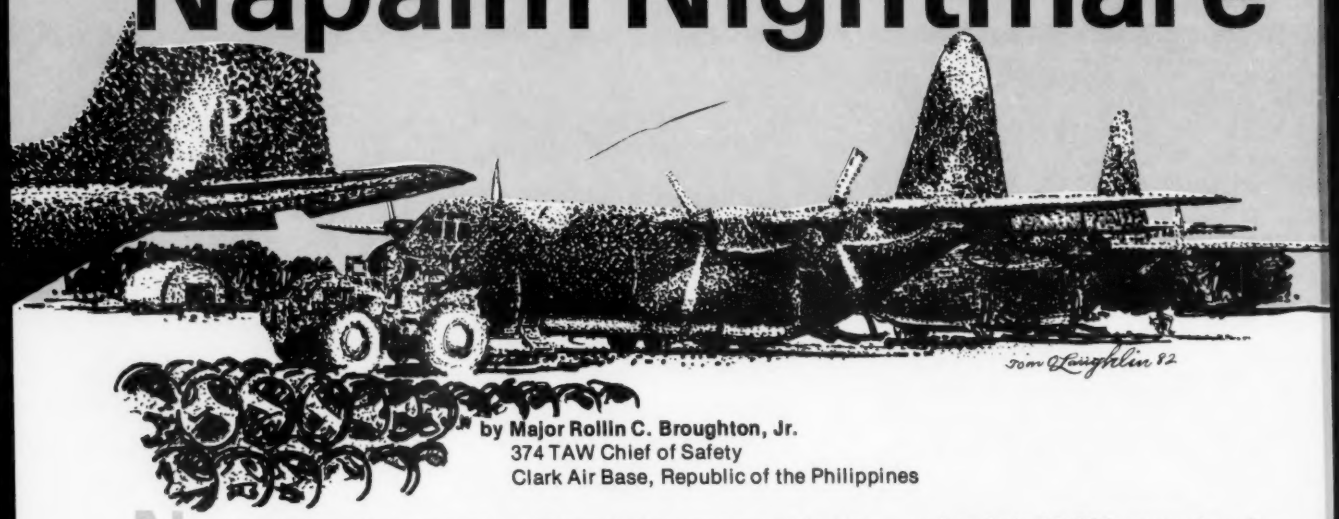
2,500

Lt Col Gerald J. Lopez, 1551 FTS
Capt William Fitzgerald, 1 HS
Capt Allen E. Hider, 1 HS
SMSgt John B. Patterson, 1 HS
MSgt John M. Adrian, 1550 TTS
MSgt Benjamin J. Marshall, Jr., 1550 TTS
TSgt David K. Monroe, 1 HS

(ranks and units are those at time of award).

This story was a real . . .

Napalm Nightmare



by Major Rollin C. Broughton, Jr.
374 TAW Chief of Safety
Clark Air Base, Republic of the Philippines

Napalm brings thoughts of horrible fires and destruction when delivered in a war environment. Fighter pilots are actually given medals for dropping the jellied death upon the enemy. The trash hauler (i.e., transport crewmembers) delivery men who haul at least as much of the stuff as their "go fast" brothers, receive almost no credit although subjected, at times, to an even greater danger. In a fighter designed for aerial delivery, the answer to an inflight ordinance emergency is to "punch it off." It isn't quite that easy, however, in a crew operated transport aircraft.

To illustrate this point, let me relate a war story. This tale will illustrate some of the actions taken by "real" crewmembers in an actual emergency. I'll talk about each crewmember's actions and propose some lessons learned for your consideration. Since I have had 13 years to analyze this situation, I have a lot of ideas why we behaved the way we did. Not being an aviation psychologist, my analysis is rudimentary, but the thought process before and after the incident might be helpful to others in similar situations.

The year—1969. The place—South Vietnam. Daily, C-130 crews were operating on the edges of both aircraft and aircrew performance envelopes. The mission this particular day was a relative piece of cake. All we had to do was fly from Cam Ranh Bay up to DaNang, "feet wet" (overwater), pick up a load, transport it to Nakon Phenom, Thailand, via northern Laos. The whole mission was high altitude, low threat. No sweat. Besides that, we were to return from "Naked Fanny" direct to Ching Chuan Kang Air Base in Tai Chung, Taiwan, to begin 7 days of crew rest (rest being a gross misnomer).

The flight to DaNang was so uneventful I don't even remember it. At DaNang we onloaded 13,000 pounds of napalm-filled cannisters and enough fuel to make it all the way to Tai Chung. The napalm cannisters had been sitting at DaNang for quite some time, and the supporting crates were beginning to deteriorate. The mission may have been a case of "use the stuff before the shelf life runs out."

Remembering that the safe withdrawal distance from napalm in a fire environment is 2,000 feet and that the C-130 cargo compartment is only 41 feet long, the inherent hazard is easy to calculate. Fire-fighting equipment for internal fuselage fires consists of four hand-held fire extinguishers suitable for use in a small camper. These might put out a cigarette, but would have trouble with a good cigar. Several parachutes were carried but not worn by the crew.

So off we went. It's about 1 hour to Nakom Phenom where we could rapid off-load the

Second Place, 1982 MAC Flying Safety Writing Contest

napalm and hightail for the bright lights of the Dirty Dozen bars in Tai Chung. The Herk lumbered up to 20,000 feet, the autopilot came on, and everything was cool—for a while, that is. Now, somewhere in the Air Force, there is a school that teaches loadmasters to understate everything. Our loadmaster was no exception. Over the interphone came, "Pilot, loadmaster."

"Go ahead, load."

"Is this here napalm supposed to smoke?" The temperature in the cockpit immediately went up 50°.

"No, load. It's *not* supposed to smoke."

"Sir, then I believe we have a fire in the cargo compartment." (Notice no exclamation point). Now it's really warm in the cockpit.

The engineer, who always gave a second opinion in emergency situations, looked through the cockpit doorway and confirmed the emission of smoke from the middle pallet of cannisters. (He used exclamation points). The one additional crewmember aboard suddenly began to yell over the interphone, "Jettison! Jettison!"

The pilot (me) began to problem solve in his mind. He told the copilot to tell the ground radar controller what was happening, declare an emergency, read the checklist, and about 58 other things. Then he decided that since the copilot was only going to repeat what the pilot told him, he, the pilot, should talk on the radios, fly the airplane, and direct the emergency actions himself.

The pilot asked the navigator if the plane was over any populated area, asked for a heading direct to the ocean and prepared for jettison procedures. The additional crewmember (ACM) kept up a running commentary on the status of the smoke in the cargo compartment. He described the situation in a loud, high-pitched, tobacco auctioneer's voice. He "suggested" that we open the cargo door and "dump the stuff."

The pilot decided to descend before depressurizing but ordered the engineer to "begin depressurization," not wanting any hypoxia victims in case the jettison didn't work. About 12,000 feet, the pilot ordered the flaps set at 50 percent (normal airdrop setting) then remembered that his cargo was not rigged for airdrop and ordered the flaps retracted to give a nose high cargo deck angle for jettisoning.

"Pilot, loadmaster. Is this napalm supposed to smoke?"

From the comments of the crew, the smoke was getting worse. The pilot then ordered the ramp and cargo door opened. The copilot pointed out that the airspeed was too high to open any doors (severe buffeting and structural damage could occur), so the pilot countermanded the opening order and slowed the airplane. From all the inputs the pilot was getting, he decided the situation had gotten bad enough that he could not risk his crew and airplane anymore by trying to reach the ocean to dump the napalm.

There was a complete undercast so whatever was on the ground was obscured. Having decided that time was running out and the risk to the airborne folks was greater and more immediate than to whatever might be on the ground, he ordered the ramp and door opened. The engineer activated the switch in the cockpit to open the doors but nothing happened. Reporting this, the engineer began to operate the switch frantically back and forth and yelled that it just wouldn't work. The loadmaster and ACM were reporting more smoke. The pilot asked about flames but received a negative report.

By now, the loadmaster had volunteered to go to the rear of the plane, past the smoke source, and open the doors from the aft control panel. He didn't put on a parachute because he didn't have time. Besides, if he had put it on he wouldn't fit past the cargo. The "calm and serene" loadmaster headed to the rear. The pilot ordered the engineer to assist because he knew more about the cargo controls than the ACM, who had already grabbed a parachute, donned it and headed for the rear. The loadmaster was successful in opening the ramp and door. As soon as it came open, the ACM began to shout to the engineer to "pull the handles" (jettison the load). The engineer, however, was concerned that he might also jettison the loadmaster and fortunately didn't act on that suggestion. Returning to the front of the cargo compartment, the loadmaster informed the pilot that jettisoning was now feasible and the pilot ordered the release of the load, posthaste. This worked as advertised, and all the napalm was dumped into the undercast and was never seen again.

The pilot, now that everything was under control, ordered the "after completion of drop" checklist to ensure all switches were returned to their proper positions. (The "preparation for drop" checklist was never accomplished.) During this checklist, the auxiliary hydraulic pump, required to open the ramp and door, was found to be off. The copilot hadn't thought of it nor was he ever instructed to turn it on. This small oversight had precipitated the entire commotion about the ramp and door. The rest of the flight was blessedly uneventful and since the war was on, no further investigation was made except for a perfunctory hearing when the crew returned to home station.

There are some valuable lessons to be learned from this incident and the way the various crewmembers handled this emergency.

The pilot luckily avoided an airborne disaster but made some potentially dangerous decisions. Deciding to jettison the napalm over the ocean was made to avoid killing any innocent ground personnel. (Lieutenant Calley had just been court-martialed and the pilot did not want to be responsible for dumping a holocaust into an unsuspecting village if he could help it.) This decision was subsequently changed when the situation entered the self-preservation regime and he ordered the jettison over land anyway.

Next, the copilot was very experienced and should have been allowed to continue his duties and use his expertise in handling the emergency. When the pilot took over the copilot's radio operator duties, he added to his own workload. If the pilot had had his wits about him, he would have told the copilot to fly the airplane and thus freed more of his mental processes to handle the emergency.

The pilot's chief mistake was that he had not briefed the crew on their duties during an emergency thoroughly enough. He didn't call for checklists that might have allowed for a more orderly jettisoning procedure. Also, he didn't know enough about the characteristics of the hazardous cargo he was carrying. This fact was not unusual in a wartime environment. The crew had considerable combat experience and was on the way home. These facts, coupled with a low threat mission, led to complacency that could have been fatal.

The ACM began to shout to the engineer to jettison the load.

The copilot's main contribution to the confusion was the failure to turn on the auxiliary hydraulic pump. When he was effectively relieved of his duties by the pilot, he withdrew and didn't do anything else. This syndrome is often found when a less experienced pilot is flying with an instructor pilot and the IP makes a mistake. The less experienced pilot may either not notice because he relies heavily on the instructor or may not say anything because he thinks the IP knows what he's doing. It also happens when two highly experienced pilots are at the controls. Neither expects the other to make a mistake.

Another factor surfaced when the engineer, performing well until then, ran into a snag he could not fix—the ramp and door would not open. Then he became fairly useless for a while because he was preoccupied with the possibility of his immediate demise. Luckily, he did recover enough not to jettison the loadmaster at the ACM's suggestion.

The navigator performed all his required duties without any problems. He was asked some questions he may have thought unnecessary (Are we over any village? How far to the ocean?), but he continued to perform his duties and greatly assisted the pilot.

The loadmaster, who in my opinion really saved the plane and crew by calm professional action, was subsequently awarded the Air Medal for his performance. He analyzed the problem and accurately informed the pilot. He carried out all instructions, added suggestions based on his experience and knowledge and managed to unravel the mess caused by the confusion in the cockpit. At great personal risk he went past the smoking area and behind the load to where he could start the pump and open the door. The situation is difficult to describe, but basically he was standing about 8 feet from a 9-by-10-foot hole in the rear of an airplane at 10,000 feet with a 10° nose-up deck angle. He then returned to his controls and completed the jettison.

Finally, the ACM deserves a little analysis. He was, in effect, little more than a passenger; the best thing he could have done was to sit down and shut up. However, since he felt he was part of the group and a qualified crewmember, he thought he should help. To this day, he probably still thinks he was helping. His frantic, high-pitched description of the

situation in the cargo compartment added to the state of tension, but did have some value to the pilot in determining how bad things were getting.

When the ACM decided that the situation was out of his control, he grabbed a parachute, but in his haste, attempted to put it on upside down with his legs through the shoulder straps. This fact may have prevented him from actually departing the aircraft. He couldn't figure out how to hook the leg straps over his shoulders but did have the presence of mind to realize that an improperly fitted parachute would not help him if he bailed out. The state of panic that led him to try to get the engineer to jettison the load, in spite of the position of the loadmaster, was in the self-preservation mode.

Fire-fighting equipment was suitable for use in a small camper.

This emergency and its analysis lead to many lessons that could help other crews react better under similar high pressure situations.

(1) The aircraft commander should brief in detail what each crewmember will do under emergency situations. This process of preplanning will cut down reaction time and eliminate false starts. Each briefing should be tailored to the actual situation and parameters of the flight.

(2) The crew should be intimately familiar with all the details and peculiarities of their cargo. It could be that the napalm cannister ruptured and gave off a harmless vapor or that the vapor under pressurized conditions in an oxygen-enriched environment is highly explosive and could be touched off by a spark from turning on or off electrical equipment. (The latter happens to be true.) Complete knowledge of all the hazards of the cargo is imperative.

(3) All crewmembers should be allowed to perform their assigned duties in an emergency situation. Attempts to take over another's duties may result in oversights and duplications. Spreading the workload may ease the potential panic.

(4) When possible, call for familiar checklists that cover the situation. In this case, a normal airdrop checklist would have covered all the required jettison preparation items.

(5) If you don't have duties, by all means stay out of the way of those who do. The ACM here could have done serious damage to himself and the rest of the crew. In this case, all he did was add to the confusion.

(6) Be familiar with all aircraft emergency equipment. Donning a parachute on the ground during life support training in an air-conditioned classroom is quite different from trying to do it in an airplane that may be on fire.

(7) The most important lesson is to be aware of complacency. Keep in mind this incident happened on an easy mission with no hostile threat and good weather. Preparation for emergencies should be a meaningful part of every preflight.

Even though this anecdote was about an almost accident, it taught me many good lessons that have been helpful in the years since. Much time is spent analyzing actual accidents for lessons to be learned. Since only one out of 300 "potential" accidents lead to a major mishap, studies of "almost" accidents are also worthwhile. Even the thorough analysis of a normal, uneventful flight can be useful, the debriefing after the flight can be just as important. It doesn't take much to break an accident's chain of events and turn a disaster into a "war story."

ABOUT THE AUTHOR

Major Broughton entered the Air Force at Craig AFB, Alabama in 1965. After UPT, he served as a pilot and instructor pilot in the C-130E at Langley and Ching Chuan Kang, respectively. Completing a stint as a functional check pilot for the Defense Contracts Administration Office at Dallas, Texas, Major Broughton then earned a masters in engineering administration from Southern Methodist University and served as Civil Engineering Chief of Programs at Eielson AFB, Alaska. At Dyess AFB Major Broughton was a squadron chief pilot. He is presently the Chief of Safety, 374 TAW, Clark AB.

C.A.S.A. C-212
Aviocar

Designed in the late 1960s to replace the Spanish Air Force's fleet of aging DC-3s, the C.A.S.A. (which stands for Construcciones Aeronauticas, S.A.), C-212 "Aviocar" first flew on 26 March 1971. Since that first flight, it has been in continuous production, rolling off the assembly line at the rate of about three per month. Like many of the smaller utility transports of the STOL variety, the Aviocar relies on simple, proven design features to achieve its impressive landing and takeoff performance.

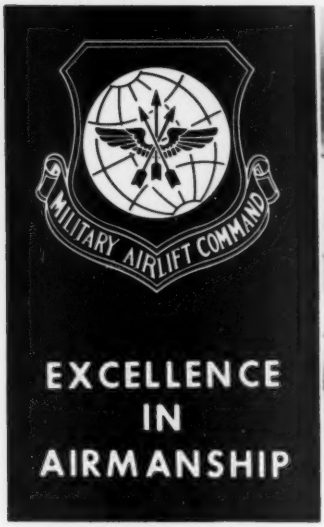
First of all, the Aviocar is equipped with efficient double-slotted flaps. Add the low wing loading of its high-mounted, cantilever wing, and it's obvious the C-212 was meant to be a STOL transport. Hang a pair of Garrett AiResearch TPE331-10 turboprop engines rated at 900 shaft horsepower to the rugged semi-monocoque, fail-safe airframe and the combination is almost complete. Finally, install a fixed tricycle landing gear with low pressure tires for rough runways, a rear ramp-and-door which can be opened for airdrop missions and the C-212 is complete.

The Aviocar also boasts some pretty impressive load carrying

Allied Airlifters

abilities. It can carry 24 fully-equipped troops, 23 paratroops, 12 litters or a maximum payload of over 2,700 kilograms (6,100 pounds). The little transport has a maximum cruise speed of just under 200 knots, and with a maximum payload and maximum fuel, the C-212 can fly 220 nautical miles. With maximum fuel and no payload, it can fly 950 nautical miles. Landing over a 50-foot obstacle requires just 1,650 feet with a ground roll of only 650 feet.

Now serving in the air forces of Spain, Jordan, Portugal, Chile, Saudi Arabia, Thailand, and Turkey, the Aviocar is also in service with several commuter airlines in the United States. In addition to the military transport and civilian commuter versions, the C-212 is also produced as a navigation trainer and a photo-survey aircraft. There are now plans for a maritime patrol derivative of the Aviocar as well. The C-212 is proving itself to be a flexible airlifter in many countries now and should be around for years to come.



Left to Right: TSgt Ronald D. Edmunds, LM; SSgt Dale M. Cohen, FE; Sgt Shirley D. Magart, LM; Lt Col Joseph W. Dangerfield, AC; Major Richard M. Wibbeler, CP; Capt Clyde O. Minish, N; MSgt Ronald C. Calloway, FE; SSgt Wayne W. Reynolds, FE; and Sgt Christopher L. Wike, LM.

Lieutenant Colonel Joseph W. Dangerfield and his 22 MAS crew were flying a C-5A on a high priority cargo mission from Diego Garcia to Clark Air Base, Republic of the Philippines. Approximately 2 hours after a normal takeoff, the flight engineer, Master Sergeant Ronald C. Calloway, noted a loss of hydraulic fluid from the number 1 hydraulic system. The system was refilled but continued to lose fluid. The number 1 system was then depressurized to stop further fluid loss and decrease the chances of an engine fire. For those not familiar with the C-5, the number 1 hydraulic system is the normal system for nose and aft main gear extension/retraction and provides additional hydraulic pressure for many flight control components. The crew planned to repressurize the system just prior to landing at Clark AB.

Shortly after the hydraulic malfunction, a bleed air overheat occurred in the number 4 engine pylon area. The crew accomplished the proper checklist and the overheat detection system was restored to normal. Twenty-five minutes later the number 1 hydraulic system gave an abnormal indication of pressure and further loss of fluid. Because the fluid loss could not be stopped, danger of fire existed and a precautionary engine shutdown was performed on the number 1 engine. Following the shutdown of the engine, a drift-down was initiated from flight level 330 to a three-engine cruise ceiling of flight level 240. Approximately 15 minutes prior to shutting down the number 1 engine, the number 3 engine gave an intermittent overheat warning indication. The crew completed prescribed procedures to correct the overheat condition on 10 different occasions. As the number 3 engine overheat continued to occur, it became increasingly obvious that a two-engine-out emergency was likely. Finally, an indication of an intermittent fire warning occurred. The crew then shut down a second engine (number 3). Colonel Dangerfield directed the copilot to declare an emergency and began an immediate diversion to Bangkok. Colonel Dangerfield and crew then began preparing for the most critical phase of flight—the two-engine approach and landing. Airspeed had to be decreased to allow the emergency extension of the aft main and nose gears while maintaining a safe margin of safety above the two-engine approach speed, prior to extending the flaps. While establishing a long range descent profile, the aft main gears were lowered and aligned using the emergency extension checklist. Emergency extension of the nose gear was then started. After 4 minutes and 30 seconds, 1½ minutes longer than the normal emergency extension time, the gear finally indicated "down and locked." Just prior to ILS glide slope intercept, the flap handle was placed to 40 percent. Extension time was again longer than normal due to the loss of number 1 hydraulic system. The aircraft was slowed to 135 knots while crossing the threshold and was skillfully brought in for an uneventful landing. The exceptional coordination of Lieutenant Colonel Dangerfield and his crew was

directly responsible for the safe recovery of all personnel and a valuable national asset during a stress-filled two-engine approach and landing in a C-5A.

Major McCauley and crew, 20 MAS.

All seemed normal to the 20 MAS crew during takeoff roll for their short notice departure from Charleston AFB. Major Ira "Dan" McCauley eased the C-141B off the runway at the computed 115-knot rotate speed. Before Major McCauley could call for gear retraction, however, the aircraft suddenly began an uncommanded roll to the right. Full aileron was applied in the opposite direction but there was no response. After a long delay, the aircraft suddenly rolled to the left, followed immediately by another abrupt and uncommanded right roll. Major McCauley applied rudder along with aileron to counter the violent rolling motions. An emergency was declared before reaching 500 feet, and the dramatic oscillations continued as they passed 1,500 feet.

Reaching for "life saving altitude," Major McCauley continued the climb to 10,000 feet to perform a controllability check and assess the situation as the loadmasters reassured the startled passengers. When the aircraft was finally

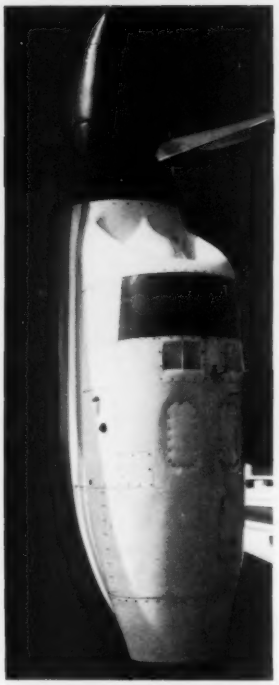
Standing Left to Right: A1C Trent A. Ruble, LM; Major Ira D. McCauley, AC; Capt Stephens E. McCauley, CP; and A1C Wilfredo E. Pino, LM.
Kneeling Left to Right: Sgt Felix R. Serret, and SSgt Joseph A. Delsordo, FE.

under control, spoiler panels and flaps all appeared to be properly positioned. Major McCauley directed the scanner and loadmasters to visually check wing and flight control surfaces for any abnormalities. A check with tower eliminated the possibility of wake turbulence or wind shear involvement during the departure.

Major McCauley then performed a controllability check and coordinated careful relay of flight control movement information from his scanners. All controls were reported to respond normally. However, the mysterious loss of flight control authority during takeoff climb was unsettling and a hasty approach and landing might prove too risky. After consultation with 437MAW stan-eval, Major McCauley elected to perform another controllability check with the ailerons depowered and in the "tab operable" mode. After review of procedures among the crewmembers, the proper switches were identified for repositioning. At the instant the left aileron tab was unlocked, the aircraft suddenly resumed the strange and uncontrollable rolling motions. The left aileron control switches were immediately restored to the "normal" position, but the sporadic gyrations and steep bank angles continued. Both pilots turned the yoke and applied full rudder into the high wing. The aircraft was still uncontrollable.

Finally, all four aileron control switches were positioned to "tab operable," and the violent oscillations subsided. Since flying in "tab operable" guarantees limited control authority, aircraft response at least now seemed more predictable. (Ordinarily, this procedure is used only to resolve a depowered or jammed aileron condition. The flight manual does not address uncommanded aileron inputs, so selecting "tab operable" was out of the realm of published procedures.) Major McCauley was still reluctant to place confidence in the airworthiness of the C-141 without full control response authority. He elected to fly a 20-mile extended descent on the ILS to minimize the magnitude of aileron inputs which might be required.

His precise aircraft control during the critical phase of final approach eliminated the need for large course corrections. The result was a smooth touchdown and rollout. After taxiing to parking, the crew returned the unpredictable Starlifter to the care of 437 MAW maintenance folks. The superior crew coordination and composure exhibited by Major McCauley and his crew in resolving this severe flight control malfunction saved 23 lives and prevented the loss of a valuable aircraft.



XV-15: Tilt-Rotor Technology

Half plane, half helicopter

by Lieutenant Colonel Alan D. York
Supervising Editor

Roger, tower, we're the airplane that's about to turn into a helicopter."

The airfield manager was monitoring tower frequency on his "brick " as a couple of us *TMF* staffers joined a small group of onlookers who were trying to spot one of the most unusual aircraft flying today. Along with the airport officials, there were transient crews off corporate jets, aircraft maintenance folks and the usual assortment of aviation buffs, all waiting to get a glimpse of Bell Textron's XV-15 tilt-rotor aircraft as it arrived at Bi-State Parks Airport, Illinois, just across the river from St. Louis. It was a perfect afternoon for the short hop up from Kentucky, and if the sunny and warm weather continued, the flight demonstration planned for the next day would draw a sizeable crowd.

I had heard of the tilt-rotor and must admit, as a former helicopter pilot, I looked toward the south with a skeptical squint. After all, this XV-15 wasn't a true helicopter and it wasn't a true fixed wing either. And I wondered about the capabilities of such an unlikely compromise.

"There it is," called someone, and I watched as the speck in the brilliant blue sky quickly grew. Strange, I remember thinking, I don't hear it yet. Your average helicopter would have announced its approach with the familiar "wap-wap" of the main rotors, or at least the buzz-saw noise of the tail rotor. Finally, I picked up a faint sound from the prop-rotors. But the most striking part of the XV-15's arrival was just then revealing itself. On downwind, the "props" began to rotate from a standard fixed-wing-type configuration back toward the vertical, or helicopter mode. By the time it was on base leg, I could clearly see the "props" had become "rotors" and the aircraft was slowing for a run-on landing down the active. Making the first turn off the runway, I was still struck by its quietness. What sound there was seemed soft, almost muffled.

After the marshalling crew got the XV-15 parked, I got a chance to chat with Dorman Cannon and Jim Arnold, Bell Textron Helicopter experimental test pilots. I asked Dorman about the transition from the helicopter

Photo by Capt Buzz Howard.

Bell Textron test pilots Jim Arnold, left, and Dorman Cannon, right, discuss the unique capabilities of the XV-15 Tilt-Rotor with *TMF* editors. Photo by Capt Buzz Howard.

Box at top of power control lever. "Coolie hat" beep switch at lower right rotates engine nacelles and rotors forward for "airplane" flight, or backward to vertical for "helicopter" flight.

mode to the fixed wing or airplane mode. "You can take off as a helicopter from a stationary hover," he began, "and the pylons (engine nacelle and rotor) will move from the helicopter to the airplane mode in 12 seconds. During that time, you'll have gone from zero airspeed and will be accelerating past 130 knots by the time the pylons get down to the airplane or full-forward position. Because the airplane stall speed is around 98 knots, and you're already at 130 knots, you have an extremely wide safety margin built into the transition maneuver. And, of course, the same margins are there for transition from the airplane to the helicopter mode.

"And the transition is basically controlled by the simple 'coolie hat' beep switches installed on the pilot's and copilot's power levers (these would be called collective pitch levers in a conventional helicopter). By moving this spring-loaded switch forward, the engine pylons rotate toward the airplane position; and moving it to the rear rotates them toward the vertical or helicopter positions.

"The engines are also interconnected by a drive shaft that allows both rotors to continue operating in case of engine failure." And as Jim Arnold remarked, "There's very little indication if one engine were to fail because the other would continue driving both rotors through the interconnect drive shaft. You would simply be limited to half the power."

As we continued talking about how straightforward everything operated, I began to realize the great efforts that must have gone into solving all the challenging problems associated with such a remarkable aircraft. The XV-15 embodied successful solutions to a host of engineering and aerodynamic problems, and this brief encounter with it and the pilots who fly it, peaked my curiosity about the tilt-rotor concept and its development over the years.

The idea of an aircraft that combines the hover capability of a helicopter with the forward speed and cruise range of a fixed-wing isn't new. As a matter of fact, by the late 1940's companies like Bell Helicopter and Transcendental Aircraft Corporation were already actively engaged in engineering studies of this intriguing concept.

Although Bell's design team had concluded that development of a tilt-rotor test bed was well within the state-of-the-art capability, they also knew there would be difficulties as there are with any technology that breaks new ground; such questions as the best type rotor system, transmission and control interface, and basic stability were just a few of the problems they would have to wrestle with if the thing was ever to get off the ground. During this same period, Transcendental Aircraft Corporation was also deeply involved in the tilt-rotor and would later be the first to actually test fly a true tilt-rotor design.

In May 1951, however, the Army and Air Force awarded a

Artists conception of proposed search and rescue (SAR) tilt-rotor. Proposed aircraft has a design gross weight of 20,000 pounds and 370 nm radius of action. Courtesy of Bell Textron.

Bell XV-3 #2 over West Texas during test flight. Photo by Bell Textron.

phase I study contract to Bell Helicopter. The first of two test aircraft underwent extensive design and component testing to evaluate both concepts and hardware that would minimize the problems mentioned earlier. Now designated the XV-3, the second prototype built was actually the first to fly, making a first hover flight in August 1955. The other XV-3 was still undergoing extensive testing of the experimental three-bladed articulated rotor system.

Further flight testing continued until inflight instability of the three-bladed rotor caused the number 1 XV-3 to crash, seriously injuring Bell test pilot, Dick Stansbury. This mechanical instability problem prompted the design team to try a simpler, two-bladed rotor system, and make some significant changes and improvements in pylon-rotor-wing design. With the two-bladed rotors installed and the other modifications complete, the XV-3's test program continued amassing technical data about tilt-rotor design and operation. By the time the test program was completed in 1966, the XV-3 had flown 270 test flights, logged 125 hours in the air, during which 110 full conversions from the vertical (helicopter) mode to the horizontal (full 90° forward or fixed-wing) mode had been successfully accomplished.

Convinced of the basic soundness of the concept, Bell continued working to solve the remaining technical problems which had resisted adequate solution during the XV-3 program. Eventually, the prop-rotor dynamic stability problem which had been the most significant drawback of the previous program gave way to innovative engineering. The development and use of automatic blade flapping control, positive pitch/flap coupling, swashplate/pylon coupling, and high wing stiffness, combined to eliminate the stability problem once and for all.

An Army program for a composite capability aircraft starting in the mid-1960s resulted in Bell using these new features in the preliminary design they proposed. The aircraft was to have two turbine engines mounted in wingtip nacelles to drive their respective three-bladed prop-rotors, each 38.5 feet in diameter. This was far different from the XV-3 where a single piston-driven radial engine mounted in the fuselage powered both rotor systems. Wind tunnel tests of scale models of the design confirmed that Bell had indeed solved the rotor-pylon-wing stability problem. The test model reached a maximum cruise speed of 350 knots. Even though further funding was halted because of the war in Southeast Asia, Bell managers and engineers felt they had acquired enough tilt-rotor expertise to pay for full-scale research using in-house funds. So in 1968, Bell embarked on a verification test program of the new, post-XV-3 technology, which led directly to the XV-15.

In 1972, the Army and NASA joined to fund construction and testing of a full-sized tilt-rotor technology demonstrator. The design competition quickly narrowed to Boeing Vertol and Bell Textron. In 1973, after extensive study of both proposals, and of flight simulator comparisons of the two, an Army/NASA contract was awarded to Bell. The first flight of the XV-15 occurred on 3 May 1977, and since then, the XV-15 has been demonstrating the impressive capabilities and versatility of the tilt-rotor concept.

The Viewer's GUIDE

Here's an update to the Airport Qualification Program list. They are available to any Air Force unit, and many are on the shelves at your local MAC aircrew learning center. You may order programs through the base audiovisual library or the Aerospace Audiovisual Service, USAF Central Audiovisual Library, Norton AFB, California 92409. Programs that have been featured in *The MAC Flyer's* "Deja Vu" are shown in bold print.

Place	Program No.	*TMF* Issue
A-306, Chunchon, Korea	50681	
Adak NS, AK	51472	
Alameda NAS, CA	**38542**	**May 1981**
Albuquerque IAP, NM	**51455**	**Feb 1979**
Alice Springs Aprt, Australia	40167	
Altus AFB, OK	38536	
Amberley RAAFB, Australia	40168	
Andersen AFB, Guam	**40161**	**Nov 1977**
Andrews AFB, MD	**38535**	**Dec 1979**
Ascension Island AF Aux	**39540**	**Oct 1977**
Barbers Point NAS, HI	39508	
Barksdale AFB, LA	50466	
Beale AFB, CA	38519	
Bergstrom AFB, TX	38963	
Buckley ANGB, CO	**39540**	**Apr 1981**
Cagayan De Oro, Philippines	50718	
Campbell AAF, KY	**50792**	**Jun 1979**
Cape Newenham AFS, AK	40169	
Cape Romanzof AFS, AK	40170	
Carrasco IAP, Montevideo, Uruguay	39503	
Charleston AFB, SC	38528	
Cheju IAP, Korea	50496	
Christchurch IAP, New Zealand	40164	
Clark AB, Philippines	**50452**	**Feb 1980**
Colorado Springs Muni Aprt, CO	**38541**	**Aug 1979**
Coolidge Aprt, Antigua	51466	
Cubi Point NAS, Philippines	**50587**	**Aug 1978**
Dakar/Yoff, Senegal	38527	
Deigo Garcia, Chagos Archipelago, UK	**n/a**	**Jul 1981**
Dover AFB, DE	38529	
Dyess AFB, TX	38533	
Eielson AFB AK	40159	
El Toro MCAS, CA	38520	
Elmendorf AFB, AK	**51453**	**Oct 1980**
Frankfurt Main, Germany	**38526**	**Nov 1980**
Fukuoka AB, Japan	50385	
Galena AFS, AK	51467	
General Lyman Fld, HI	**39530**	**Jul 1977**
George AFB, CA	39507	
Grand Forks, AFB, ND	51174	
Guantanamo Bay NAS, Cuba	**40144**	**Dec 1977**
Hickam AFB, HI	**39531**	**Aug 1980**
Hill AFB, UT	**38532**	**Apr 1978**
Hoengsong, Korea	50780	
Howard AFB, Panama	**50475**	**Mar 1978**
Indian Mountain AFS, AK	**40172**	**Aug 1977**
Iwakuni MCAS, Japan	**50716**	**Sep 1978**
J.F. Kennedy IAP, Bolivia	**40145**	**Jan 1978**
Jan Smuts Aprt, S. Africa	38573	
Kadena AB, Japan	**50555**	**Aug 1982**
Kaneohe Bay MCAS, HI	39532	
Kangnung, Korea	50719	
Keesler AFB, MS	**50477**	**Jun 1980**
Kelly AFB, TX	**50465**	**May 1980**
Kinhae IAP, Korea	50717	
King Salmon, AK	51468	
Kodiak Airport, AK	51367	
Kunsan AB, Korea	**50588**	**Mar 1982**
Kwang Ju, Korea	50589	
Lajes Field, Portugal	**51456**	**Sep 1980**
Learmonth Aprt, Australia	40166	
Little Rock AFB, AR	40331	
March AFB, Ca	39506	
Mariscal Sucre Airport, Ecuador	**50501**	**Apr 1979**
Mather AFB, CA	38522	
McCalla Field, Cuba	52417	
McChord AFB, WA	**40160**	**Jul 1978**
McClellan AFB, CA	38523	
McGuire AFB, NJ	38530	
Moffett Field NAS, CA	38524	
Nellis AFB, NV	**50830**	**Oct 1979**
Norfolk NAS, VA	**51368**	**Jun 1977**
Norton AFB, CA	**51437**	**May 1978**
Offutt AFB, NE	50507	
O'Hakea RNZ AFB, New Zealand	40177	
Osan AB, Korea	50556	
Pago Pago Aprt, Am Samoa	**40162**	**May 1977**
Patrick AFB, FL	51161	
Pease AFB, NH	50508	
Perth IAP, Australia	40165	
Phoenix Sky Harbor INT, AZ	51703	
Pope AFB, NC	50791	
Pres Stroensser Aprt, Paraquay	39504	
Prestwick IAP, Scotland	**51435**	**Apr 1982**
Pudahuel IAP, Chile	**39502**	**May 1979**
R–407, Korea	50384	
R–222, Korea	51470	
RAF Lakenheath, UK	50453	
RAF Mildenhall, UK	51434	
RAF Upper Heyford, UK	50777	
Ramstein AB, Germany	**51430**	**Mar 1979**
Richmond RAAFB, Australia	40163	
Robert Gray AAF, TX	**40158**	**Feb 1978**
Rota NS, Spain	**51433**	**Dec 1981**
Scott AFB, IL	50476	
Seneca AAF, NY	50499	
Shemya AFB, AK	**38538**	**Jan 1981**
Sigonella NAS, Italy	**51475**	**Jun 1982**
Sondrestrom AB, Greenland	**39533**	**Sep 1977**
Sparrevohn AFS, AK	**40171**	**Oct 1978**
Taegu AB, Korea	**51474**	**Dec 1978**
Tatalina AFS, AK	40175	
Templehof AB, Germany	**51423**	**Oct 1981**
Tin City AFS, AK	51469	
Toncontin IAP, Honduras	50500	
Torrejon de Ardoz, AB, Spain	38525	
Travis AFB, CA	50958	
Wainwright AAF, AK	**40176**	**Jan 1979**
Yokota AB, Japan	**50715**	**Nov 1978**

DEJA VU

Kadena Air Base, Japan

(elevation: 146 feet)

Located on the southwestern coast of the island of Okinawa, Kadena Air Base is 300 miles southwest of mainland Japan. The nearest airfields suitable as alternates are Naha, 12 miles southwest, and Taipei International, 360 miles southwest. The highest point within 25 miles is a hill, 1,486 feet MSL and 19 miles northeast. Emergency safe altitude within 100 nautical miles of Kadena is 2,700 feet.

Kadena has two parallel runways, 05L/23R, 12,100 feet long and a whopping 300 feet wide; and 05R/23L, also 12,100 feet long but "only" 200 feet wide. Parking ramps are located on both sides of the runways. Base Operations is at midfield to the southeast of the runways.

Runway 05L, the preferred runway, is a precision runway with high intensity approach lights, a 1,000-foot overrun, jet barrier, VASIs and high intensity runway lights. Circling is not authorized northwest of this runway. Always use extreme caution for extensive vehicle traffic and on-going construction while taxiing.

Instrument approaches to Kadena include tacan, VOR/DME, ILS, PAR, and ASR for the runways. Keep in mind the PAR for runway 05L/23R does not coincide with the VASIs. If you spot any airfield changes not included in the airport qualification programs please notify MACAF/DOTs so they can update these programs.

—Adapted from AQP 50555

On short final, runway 23R. The approach end has no overrun.

On final, 1 mile, to runway 05L. The approach is over the East China Sea. The MAC and TAC parking ramps are to right, SAC ramp to the left.

On short final, runway 05L. A go-around presents little hazard.

C.R. TERROR

The Skyways Sultan slips off to pickup the "CINC."

So they finally upgraded you to IP!" The incredulous tones of Lieutenant Colonel I.M. "King" Foraday echoed solemnly through the nearly deserted hall of the squadron's operations shack. "I don't believe it. I just don't believe it. Doesn't the Air Force have any self-respect left?"

"Well I did pass my checkride with 'flying colors,'" the Ace of Aerospace defended. "I mean, with all due respect, sir, it says so right here on the Form 8."

"What it says, Major Terror, is that you flew so 'well' you turned the evaluator green. You made him sick! I was there when you landed, remember?"

"Oh yes, now I recall, sir. You remarked it was the first time in nearly 20 years a checkride was passed by default."

"What I said was that if anything happened to that young evaluator, it would be *your fault,* Major!" The Sabreliner Skipper could see the veins in Colonel Foraday's neck starting to appear as the operations officer's voice kept pace with his rising blood pressure. "Now let me give it to you straight. Tomorrow, you are to take young Lieutenant Hamilton Hands and check him out—again—as a qualified copilot. If you can manage to requalify him, you can instruct anybody. *Anybody!* Got any questions, C.R.?"

"Only one, sir. Where are we going?" asked the Worrisome Warrior.

A cunningly sly, evil grin slowly stretched its way across Colonel Foraday's craggy facade. He hesitated just enough to allow the suspense to build in the Magnificent Major's mind, playing the scene for all it was worth, and then some. "You, my fine feathered flyer, are going to Andrews to pick up the—"

"I'm going to pick up the CINC?" C.R.'s Mach-2 mouth raced light years ahead of his subsonic brain and cut off the operations officer's orders before he finished them.

"That's right, Major Terror. You *are* going to pick up —"

"The CINC! Oh, thank you, sir. I'll be careful. And I won't let you down. I won't let the squadron down. I won't let the Air Force down. I won't! No, sir. You'll see. I can do it, and I'll requalify Lieutenant Hands, too. Oh, yes sir, I will." With that, C.R. shuffled backwards toward the door, his head bobbing as he repeated assurances to the colonel. "Imagine that," he mumbled to himself as he ran with all the speed he could muster to his "vintage" E-type Jag, "I'm going to pick up the CINC. Me. C.R. Terror! World's Greatest Aviator." And with that, he gingerly placed one foot over the Jag's door and shoehorned himself into the cockpit. Imagine that, he thought to himself one more time, as he made his way to the "O" Club to contemplate this awesome turn of events over a Terrorific 'tini.

The next morning dawned earlier that the Field-grade Fumbler would have liked, but he readied himself in record time and dashed for the carport where the venerable British-racing-green Jag lay in unadorned splendor. He gingerly tossed his 45-pound pubs bag behind the driver's seat, nearly collapsing the car floor. Sliding behind the genuine lizard steering wheel, C.R. cranked reluctant life into the big engine.

"Come on sugar, don't fail me now. I'm off to Andrews-by-the-sea to pick up his majesty, the CINC." And as C.R. cleared the carport's protective cover, it suddenly dawned on him that it was raining. Gingerly moving the E-type back under the carport, a slightly soaked C.R. raised the top and then headed out for the base again, a tad wetter, but alas, no wiser than before.

The Master Manipulator met his pupil at the squadron, discussed some timely subjects pertinent to flying safety and then proceeded to base operations to flight plan and file. A short time later, the "Dynamic Duo" were off and winging their way to "the home of Air Force One."

"Did I ever tell you about the time I had to take over for the President's pilot, Ham?" queried the Ace of Airlift.

"No sir, you didn't. By the way, sir, did you see that the anti-skid was written up as being inop?"

"Why those . . . Er, yes, Ham, I did. But not to worry," encouraged C.R. "With my sterling airmanship, landing this 'tricycle' on wet pavement will be no different than landing in the scorching desert."

"Well, that's good," remarked Lieutenant Hands, "because Andrews just reported the braking action as poor to nil on a wet runway with the ceiling coming down fast. Do you want to divert to Langley? They're reporting clear and 7 with a dry runway."

"Don't be so naive, my young fledgling. As long as the proper techniques are employed, landing this two-engined dog whistle is no different than landing a Cessna 172. Descent checklist. And by the way, this is your approach and landing, lieutenant."

After fighting their way through the maze of self-induced "miscommunications" around Washington Center, Rotund 13 finally ended up on a semblance of an ILS final, gear down and the anti-skid still inop. Ham Hands flew a passable approach until he was about 200 feet above decision height. Then he seemed to live up to his name, or in this case, live *down* to it. And dive down he did, picking up an additional 500 feet-per-minute rate-of-descent on short final in a classic duck-under maneuver.

"Egads. Full power, flaps down, right full rudder, get off the controls, *my plane!*" C.R. managed to wrest control of the hurtling Sabreliner from his non-compas-mentis-minion and pull the airplane out of a semi-screaming dive shortly before the miniliner would have impacted the rain-slickened tarmac. But instead of putting it on rather firmly within the first few feet of the runway, C.R. flared with all

the finesse he could muster and slipped the Sabreliner onto the runway, nearly 4,000 feet from the end. He then promptly plopped his size-12 brogans onto the binders with the expected results.

"Get off the controls, Hands. I've got it."

"I'm not on the controls, Major. You're sliding. Engage nosewheel steering. Get off the brakes." Ham was now screaming at the top of his lungs as he watched the 2,000 feet-remaining marker rush by—sideways.

"I wished this beast had reverse on it," yelled the Master Manipulator. "Hold on, Ham. I'm gonna try to salvage it." With that C.R. stomped full opposite rudder and jammed in full opposite throttle to try to and straighten the '39. He met with some success. The CT-39 suddenly jerked back to a normal position just before it ran off the end of the runway and mired itself in the waiting mud.

"Well, we'd better get transient alert out here and get this beast wiped down before the CINC gets here. I figure we can clean it up and do a quick inspection before the 'four-star' arrives. Now don't just stand there! Get out and help me push."The Dynamic Duo clambered out of the Sabreliner and tried to help the transient alert people retrieve the mud-caked craft. After they pushed it back to the hangar, C.R. borrowed some overalls and commenced imitating a car-wash attendant, trying to get the inch-thick mud off the '39 before their "volant VIP" arrived. About that time, the loudspeaker came to life in the hangar.

"Would the AC off Rotund 13 please report to the dispatch desk?"

"I'm Major Terror, sergeant. Is the CINC going to be late or something?" C.R. asked the base operations dispatcher.

"Oh, no sir. In fact the sink is here now. I just wanted to know where you were going to put it."

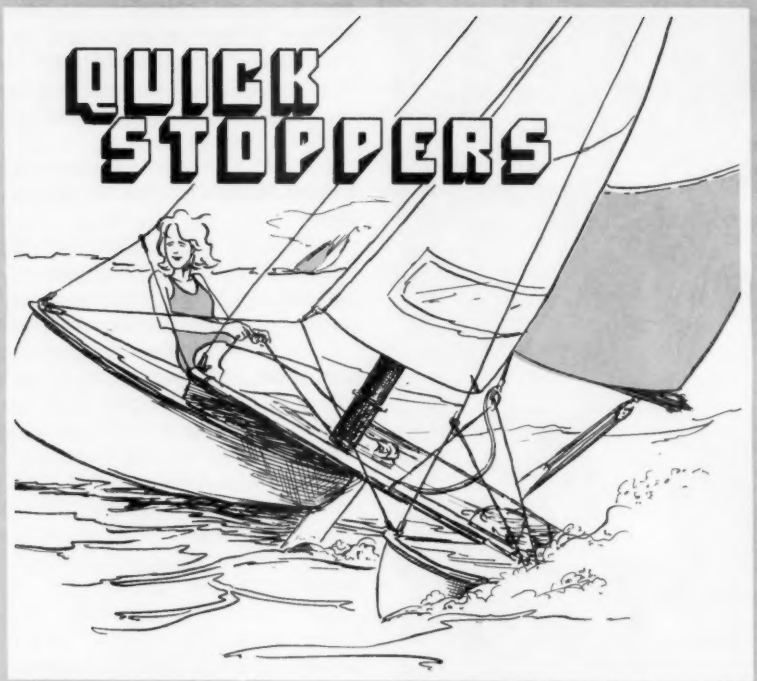
"What do you mean *it*, sarge? That's no way to refer to such a super-senior officer and the commander of a major command. It'll pay you to have a little more respect for your superior officers from now on."

The dispatcher looked unjustly hurt, and replied, "Yes, sir. I do respect senior officers, but what I'd like to know is what you're going to do with this." With that, the young E-5 motioned to a box about 3-feet square and labeled in the best G.I.-styled stencil, "Sink, Marble, One Each, Handle With Care." And the label was addressed to "Services Officer, McMac AFB."

C.R.'s mouth dropped open in utter shock and amazement. His eyes rolled back into his ample brow and he fell back onto the base operations dispatch desk knocking some AWTH forms askew. Fortunately the young staff sergeant caught the Teetering Titan and eased him down on one of the nearby couches.

"Major Terror, are you all right, sir?"

"I'll be all right in a while, son. Just let me sit here and look at the sink. On second thought, I ought to open it up and use it right now—to wash the egg off my face."

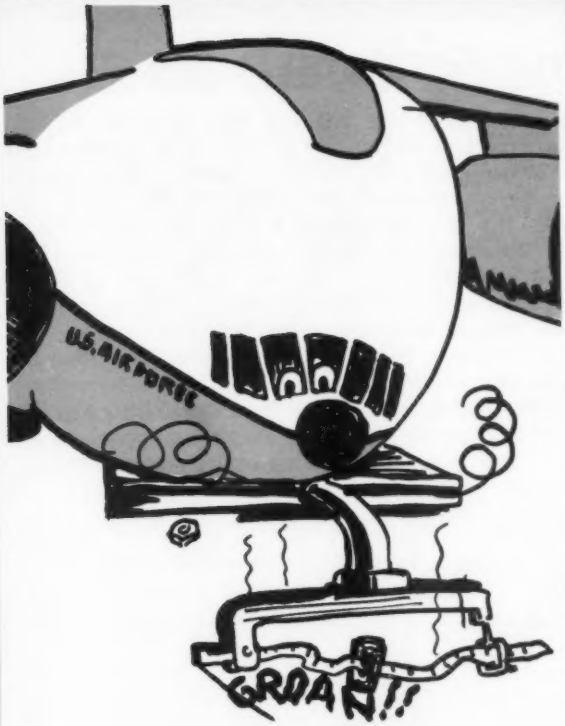


ERO — Extra Risk Operation

During this night engines-running-offload, the Starlifter loadmaster removed the previously installed third wheel retaining safety device from the tongue of a 4,500 pound two-wheel trailer, otherwise known as an M-105. As the trailer was being towed off the plane, the retaining mechanism failed. The third wheel then fell, piercing the ramp and resulting in a 2-foot tear in the center of the ramp floor. Damage for this little oversight was somewhere in excess of $7,400. But it might have been worse. The loadmaster might have been asleep under the third wheel when it fell off instead of being asleep behind the "8-ball."

Hang-up

The C-130E aircrew was flying a personnel airdrop and everything had gone as planned until the loadmasters attempted to retrieve the static lines. The static-line retriever stopped abruptly and it appeared the lines were caught up on something outside the aircraft. The loadmaster reversed the retriever and then pulled the lines back into the Herk using his hand to hold the lines away from the side of the aircraft. It appeared the static lines had hung up on the aux hydraulic pump vent line just aft of the paratroop door. Now, for those of you who never noticed this little idiosyncracy before, that's because the vent line is mandated by T.O. 1C-130B4 to be mounted flush with the fuselage skin. The 90° elbow on this Herk was not in compliance with said tech order. A further check with several other aircraft revealed that one other airplane had also been outfitted with the wrong vent line. "Herky, Herky, well and able, get your elbows—90°, one each—off the table."



Overweight Starlifter

Exercise time in MAC and this C-141B was filled to the gills with pallets weighing in at 39,980 pounds, or at least that's what the Army types said the pallets weighed. Anyway, the fearless crew took off from the Alaskan base, but noted almost immediately the pronounced sluggishness in the way the Starlifter handled on takeoff. In fact, the C-141 couldn't even be coaxed up to its charted cruise altitude. Fearing something was really amiss, the crew called ahead and requested the pallets be reweighed upon landing at their Kentucky destination. Sure enough, the crew's suspicions were confirmed when the MAPS folks weighed the load. The crew found, to their dismay, that their load had "gained weight" during the flight, in fact some 9,720 pounds to be exact. This brought the total load weight to 49,700 pounds! Although still under investigation, it looks like the culprits were a set of faulty electronic scales used to weigh the pallets at the forward onload location. And once again we are forced to repeat the well-worn phrase, "caveat aviatoris"—let the aviator beware!

"Pull Off Some Power? Right!"

While training in the local pattern, the Sabreliner IP decided his student needed some "simulated" engine-out work. The IP retarded the left engine throttle to idle while the CT-39 was on short final. Unfortunately, the left engine was thinking it was time for some "real" engine-out work and immediately flamed out. Our intrepid aviators felt this was enough,however, and made the "practice" approach into a full stop, engine-out landing. After some trouble-shooting, the maintenance wizards found the throttle separation bar on the throttle quadrant was broken which allowed the throttle to move sideways. So, when the throttle was pulled to idle, it went right past the idle stop to the cutoff position. Since the maintenance crew fixed this little problem, we're happy to report the airplane has had no repeat write-ups of the flame-out variety.

Retaliating Targets

The young Jolly Green Giant crew was out on the gunnery range looking for targets of opportunity when the pilots spotted some old WW II tank hulls. Thinking these rust kings unlikely to shoot back, the gunner prepared to fire. The instructor in the right seat entered a 20° right bank from 200 feet AGL and the gunner let go with a barrage from his 7.62 mm M-60 machine gun. Seconds later, the pilots heard a distinct pop and began to search the cockpit for anything unusual. The IP then spotted a small circular hole in the overhead plexiglass window just behind the pilot's map light. He then found a small piece of plexiglass on his left sleeve. Figuring this was enough practice, especially after getting return fire from the derelict tanks, the CH-3 headed for home. After landing, a shred of ferrous metal was found on the cockpit floor. Apparently one of the rounds hit just right, causing shrapnel from the tank to rebound into the Jolly Green's window.

NOTABLE QUOTE

DEFENSIVE FLYING

Rules about right-of-way are for guidance only. There is no right-of-way. Every pilot must be wide awake at all times, and prevent his ship from getting dangerously near any other ship.

Notes and Rules for Pilots and Crews, War Office, U.S.A. 1917

AFTER DEADLINES

MAC FLIGHT MISHAPS ON RISE--During 1981, MAC aircrews experienced a total of six DOD Class A flight mishaps. In the first 6 months of 1982 we've already had six Class A flight mishaps! In March an HH-3 crashed at Mount Withington, New Mexico. The aircraft landed, rolled down an incline, and came to rest on its side. On 13 April a C-130H crashed 70 miles east of Sivas, Turkey. The aircraft broke up in flight killing all 9 crewmembers and 18 passengers. One month later, a C-130E crashed 30 miles northeast of Little Rock AFB resulting in seven fatalities. On 8 June a C-5A experienced a number 1 engine explosion and fire at Altus AFB. Just 3 days later, a UH-1F crashed near Butler, Missouri, killing two crewmembers and four military policemen. Finally, an HH-3E crashed 20 feet short of a mountaintop helipad, 35 miles northeast of Osan AB, Korea. The helicopter rolled over and burned, but the crew suffered only minor injuries.

MAC also had one DOD Class B flight mishap this year. This occurred on 6 June when a C-5 engine exploded and caught fire.

In addition to these flight mishaps, MAC aircraft have been involved in two DOD Class A non-flight mishaps. On 7 March a C-141 at McEntire ANGB, South Carolina, was destroyed in a ground fire that started in the area of the number 3 hydraulic service center. On 2 July a CT-39 at Ramstein AB jumped its chocks during a ground engine run. The Sabreliner ran into a crane and was destroyed by the subsequent fire. The saddest part of producing a flying safety magazine is publishing statistics like these. Six is enough! It will take all of our concentrated efforts to reduce the number of safety mishaps in MAC for the remainder of the year.

C-141 "STRETCH" PROGRAM COMPLETED--It finally happened. The last C-141 stretched to "B" standards, rolled off the modification production line at Lockheed-Georgia's facilities at Air Force Plant 06, Marietta, Georgia on 29 June 82. Tail number 63-8076 from the 438th Military Airlift Wing, McGuire AFB, now holds the honor of being the last Starlifter to be fitted with fuselage plugs adding 23.3 feet to its length and an aerial refueling receptacle. These new features give the C-141B its now easily recognizable and unique shape. The entire modification program lasted almost 3 years. On 29 September 1979 the first C-141A was delivered to Air Force Plant 06 to begin the "stretching process" which would eventually include all of MAC's fleet of 270 Starlifters.

THE FIRST PUBLIC-USE MICROWAVE LANDING SYSTEM (MLS) is scheduled to be installed this fall at the Wexford County Airport, Cadillac, Michigan. In addition to the Cadillac MLS, built by the Hazeltine Corporation, the State of Michigan plans to install similar equipment at the Sturgis and Belaire airports. Another non-federal program is underway in Alaska. There, the city of Valdez is installing a Bendix-made MLS at its airport. Under the federal Service Test and Evaluation Program (STEP), the FAA has four MLS installations; two at Washington National, one at Philadelphia, and one at Clarksburg, West Virginia. (See March '82 TMF, "The Microwave In Your Future"). Information courtesy: Western Pacific Intercom.

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